

COMPOUNDS TO BE EVALUATED  
FOR ENVIRONMENTAL EFFECT



# ORGANIC PHOSPHATE COMPOUNDS

Source(s)	Chemical
1,4R,5	tetraethylpyrophosphate (TEPP)
1,4R,5	parathion
1,4R,5	methyl parathion
1,4R,5	EPN
1,5	OMPA (octamethylpyrophosphate)
1,4R,5	demeton (Systox)
1,4R,5	dimethylphosphate of 3-hydroxy-N-methyl- cis-crotonamide (Azodrin)
1,4R,5	dimethylphosphate of 3-hydroxy-N, N-methyl- cis-crotonamide (Bidrin)
1,4R,5	disulfoton (Di-Syston)
1,4R,5	ethion
1,4R,5	O, O-dimethyl-S-(4-oxo-1,2,3-benzotriazinyl- 3-methyl) phosphorodithioate (Guthion)
1,4R,5	mevinphos (Phosdrin)
1,4R,5	phorate (Thimet)



# CHLORINATED HYDROCARBON COMPOUNDS

Source(s)	Chemical
1,2,3,4P	DDT
1,2,3,4P	DDT (TDE)
2,3,4P	aldrin
2,3,4R	benzene hexachloride
2,3,4R	chlordane
1,2,3,4P,5	dieldrin
1,2,3,4P,5	endrin
1,2,3,4P	heptachlor
2,3,4P	lindane
1,2,3,4P	toxaphene
2,4P	terpine polychlorinates (Strobane)
2	chlorobenzilate (ethyl 4,4' dichlorobenzilate)
2,4R	dodecachlorooctahydro-1,3,4-metheno-1H-cyclobuta (cd) pentalene (Mirex)



# OTHER COMPOUNDS

Source(s)	Chemical
2	captan
2	folpet
2	pentachloronitrobenzene (PCNB)
2,3,4P	2,4,5-T
3	2,4-D (butyl, isopropyl, & isooctyl esters)
4R	2-(p-tert-butylphenoxy)-1-methylethyl 2-chloroethyl sulfite (Aramite)
2,4P	amitrole
1	4-nitropyridine N-oxide (Avitrol 100)
1	4-aminopyridine hydrochloride (Avitrol 200)
1	3-chloro-p-toluidine hydrochloride (Starlicide)
1,4R	sodium fluoacetate (Compound 1080)
3	silvex
4R	4-amino-3,5,6-trichloropicolinic acid (Picloram)
1	3',4'-dichloropropionanilide (Propanil)



# MERCURY COMPOUNDS

S= seed treatment

T= turf fungicide

I= industrial use (wood, fiber, textile, paint)

O= ornamental fungicide

	Type	Source(s)
hydroxymercuri chlorophenols	S,T	1,2,4P
mercuric chloride	T,O	2,4P
mercurous chloride	T,O	1,2,4P
methylmercury dicyandiamide	S,T,O	1,2,4P
sodium ethylmercurithiosalicylate	O,I	2,4P
mercuric dimethyldithio carbamate	T	2,4P
mercuric oxide	I	2,4P
mercuric phenate	I	2,4P
diphenylmercury dodecenyl succinate	I,O	2,4P
phenyl mercuric acetate	S,T,I	1,2,4P
phenyl mercuric triethanol ammonium lactate	O	2,4P
phenyl mercury borate	I	2,4P
phenyl mercuric propionate	I	2,4P
phenyl mercuric nitrate	O	2,4P
phenyl mercuric oleate	I	2,4P



# CARBAMATE COMPOUNDS

Source(s)	Chemical
2	carbaryl
2	S-2,3-dichloroallyl diisopropylthiocarbamate (Avadex)
1,4R,5	2-methyl-2-(methylthio)-propionaldehyde O-(methylcarbamoyl) oxime (Temik)



## ARSENIC COMPOUNDS

	Source(s)
arsenic acid	1,4P
arsenic pentoxide	4P
arsenic trioxide	1,4P
calcium arsenate	1,4P
calcium arsenite	4P
copper arsenate	4P
copper acetoarsenate (Paris Green)	1,4R
disodium methanearsonate	4R
lead arsenate (standard and basic)	1,4P
monosodium acid methanearsonate (MSMA)	4R
sodium arsenate	4P
sodium arsenite	1,4P

## CADMIUM COMPOUNDS

cadmium carbonate	2
cadmium chloride	2
cadmium sebacate	2
cadmium succinate	2
phenyl amino cadmium dilactate (all for use on turf)	2

## THALLIUM COMPOUNDS

thallium sulfate	1,4P
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## ENVIRONMENTAL EFFECT OF PESTICIDES

The California Department of Agriculture must give special attention to the registration of pesticides in accordance with provisions of Chapter 3.5, Environmentally Harmful Materials, Division 7, of the California Agricultural Code.

Dr. Swift has suggested that the Department, with advice from the Director's Pesticide Advisory Committee, establish a list of chemicals and a priority schedule for environmental registration review. In this context, there are enclosed a copy of the May 5, 1970 Criteria for Environmentally Harmful Pesticides, a copy of our report of significant actions undertaken during the 1970 year, and a copy of the United States Department of Interior Policy on Pesticides.

The attached list of compounds can be used to select the pesticides needing 1st order, 2nd order, etc. of priority or no environmental review. The list is not necessarily complete; additions can be made to it as desired. It was compiled from various sources, such as

1. California Injurious and Restricted Materials (under permit)
2. Mrak Report - chemicals needing further study
3. Clean Environment Act (People's petition) - prohibited pesticides
4. Policy on Pesticides, U.S. Department of Interior, 1/12/70 (R-restricted, P-prohibited)
5. Highly toxic pesticides ( $LD_{50}$  less than 50 mg./kg.)

The numbers 1 to 5 on the list identify the source(s) as above.

Please inform Dr. Swift of your opinions on this subject.



## CALIFORNIA DEPARTMENT OF AGRICULTURE



May 5, 1970

CRITERIA FOR ENVIRONMENTALLY HARMFUL PESTICIDE

DEFINITION:

A pesticide shall be considered as environmentally harmful if the pesticide, its metabolites, or its degradation products produce deleterious effects on the environment or individual components of the environment in the form of injury to non-target organisms whether persons, wild or domestic animals, or plants; or disruption of ecosystems at the time and place of use, or elsewhere by drift or other movement; or as a consequence of the presence of residues remaining in vegetation, animals, soil, or water.

DETERMINATION:

After due consideration of the benefits to be derived and the risks which are involved, judgment on the need for regulation or prohibition of registration or use shall be rendered based on an assessment of the following characteristics:

1. Acute toxicity
2. Chronic toxicity
3. Persistence and transformation
4. Mobility
5. Biological magnification
6. Accumulation in human or animal tissues
7. Intended usage, from both a qualitative and quantitative standpoint

Continuing reappraisal will be necessary to assure that as new information becomes available with regard to the environmental implications of the use of the pesticide, the information is carefully considered in terms of need for reconsideration of the original decision to register or regulate.



In accordance with the enactment of Chapter 3.5, Division 7, Agricultural Code, Environmentally Harmful Pesticides, Stats. 1969, Ch. 1169, the California Department of Agriculture respectively submits its annual report to the California Legislature.

Section 14104 states that the annual report shall encompass the following areas:

1. Extent to which environmentally harmful materials are used.
2. Control exercised over use of these materials.
3. Programs leading to elimination of environmentally harmful materials or elimination of injury by their use.
4. Progress in improving conditions of the environment in relation to use of such materials.

The following is a listing of the significant actions undertaken during the 1970 year:

I. Extent of Use of Environmentally Harmful Materials

○ "The Pesticide Use Report for 1970" tabulates for the first time all pesticides used by licensed agricultural pest control operators, licensed structural pest control operators, state and county agricultural departments, University of California, California Division of Highways, California Department of Water Resources, vector control agencies, county road departments, irrigation districts, U. S. government agencies, reclamation districts, city and county parks, school districts, and from growers using injurious or restricted materials.

"The Pesticide Use Report for 1970" is the result of computerizing the data collected statewide from the above listed sources. Included in this report are all of the injurious and restricted materials and over 80% of all pesticides used in the state. (Attachment 1)

Quarterly, a comprehensive report listing the amount of each pesticide used and the uses of each is published for distribution to legislators, governmental agencies, industry, and other interested persons.

The University of California is using the data from the pesticide use reporting program in their environmental studies and worker safety programs.

The Department was able to supply accurate data on pesticide usage for the entire California coast line, mile by mile, to the Comprehensive Ocean Area Study for use in their research.



All economic poisons registrants are required to submit quarterly reports to the Director indicating the type and quantity of all pesticides classified as injurious materials sold within the state.

## II. Control Over Use of These Materials

- Regulations have been adopted adding mercury seed treating compounds, mercury treated seed grain, mercury treated seeds of beans and peas, and endrin treated conifer seeds to the injurious materials list. This means that these materials can be used only after the agricultural commissioner issues a permit which provides additional restrictions governing their use in a safe manner to protect the environment. This action was taken as the result of a joint monitoring study with the Departments of Agriculture, Fish and Game, and Public Health.
- Manufacturers of chemicals containing the herbicide 2,4,5-T have been notified to call back or relabel all formulations in trade channels that list the material for use around homes, lakes, and ponds, or on recreation areas as the registration for these uses have been canceled. Both county and state inspectors are now inspecting retail outlets to enforce compliance. The restrictive action was taken as a precautionary measure when laboratory experiments indicated that the chemical and one of its contaminants, dioxin, may cause birth defects in some test animals.
- Regulations were adopted to strengthen our control over organophosphorus pesticides designating Guthion and ethion as injurious materials and requiring a permit for their use anywhere in the state.
- California agricultural pesticide dealers and agricultural pest control agents are now subject to strict licensing and registration requirements. The dealer, in order to obtain a license, must pass an examination testing his knowledge of laws and regulations governing the sale and use of pesticides. The agricultural pest control agent must register with the agricultural commissioner of every county in which they operate. The dealer also must keep for one year a record of all pesticides sold or delivered including the name of the agent making the sale. These records may be inspected to assure compliance.
- The computerized pesticide use reporting system is an effective tool for the Department and county agricultural commissioners in regulating and controlling the use of pesticides and in pinpointing any problem areas.



Each reported agricultural pesticide application is checked for compliance with registered usages by the computer, which will flag errors for follow-up investigation and enforcement action where indicated.

- Computerization of the economic poison file, which will necessitate that each label carry its own individual registration number, will provide for retrieval of data from the file and increased accuracy of the pesticide use reporting system.
- In order to provide both county and state enforcement inspectors with a concise source of information relating to the regulation of pesticides, the Pesticide Management Manual was compiled. This manual provides instructions, policies, and informational papers including listing of all state licensees and is organized for quick reference. It is kept up to date with current mailings from the Department.
- An in-service training program presented by the Department was made available to the staffs of all county agricultural commissioners. The session provided training in the inspection of agricultural application equipment. Among its objectives were to provide for complete and uniform evaluation of equipment to minimize the hazards of drift, and injuries to workers and other people. The effect of equipment as it relates to protecting the environment was stressed to the county inspectors.
- In considering a pesticide environmentally harmful, it has been established that the pesticide or its breakdown products create a deteious effect on the environment in the form of injury to non-target animals, plants or organisms or disruption of eco-systems, or by the presence of residues in vegetation, animals, soil or water. Judgment on the need for regulation shall be based on such characteristics as acute and chronic toxicity, persistence and transformation, mobility, biological magnification, accumulation in human and animal tissues, and intended uses both qualitatively and quantitatively.

### III. Programs Leading to Elimination of Environmentally Harmful Materials or Elimination of Injury by their Use.

- The concern over the working conditions of farm workers in pesticide-treated citrus groves prompted regulations requiring the farm operator of a citrus planting to keep workers who pick or engage in other activity requiring substantial contact with foliage out of treated groves until 30 days after the last application of parathion, ethion, or Guthion.



- The Pesticide Advisory Committee, following reports of farm worker illnesses, recommended time intervals to be observed before workers are permitted to enter certain crop areas treated with organo phosphorous and other pesticides. A hearing has been held and adoption of a regulation is forthcoming. Additional restrictions on this subject are currently under study.
- The plan to phase out the use of DDT and DDD in California is progressing orderly. At the present time DDT and DDD have been removed from use on 67 agricultural crops and animal uses plus home garden and household uses. This was a result of the reported widespread distribution of these chemicals in the environment, and its affect on non-target organisms. The University of California is currently seeking substitutes for DDT on additional crops whereupon the Department will act on its findings. It is estimated that the amount of DDT used in 1971 will be less than 10% of the amount used prior to peak year usage of 10 years ago. State and county inspectors are cooperating in a statewide effort to remove all remaining stocks of household products from retail outlets.
- Registrations of products containing mercury have been canceled for use in California as slimicides, algicides, or in laundering operations. Information has been received that mercury is appearing in food items and in the environment. Pesticides that have been registered for these uses may be contributing to the appearance of mercury in the environment and in food items. There is a variety of other chemicals to do these jobs with less hazard to the environment.
- Registration of 91 different pesticides on farm crops have been canceled and new restrictions placed on another 120 pesticides. These figures do not represent additional restrictions placed on DDT and mercury products. Registration can be canceled or refused if a pesticide is seriously detrimental to the environment or is more hazardous than alternative materials. In some cases, the canceled materials have never been used in California or they have had limited uses and substitute materials are available. The action places many new restrictions particularly on the chlorinated organic group of pesticides that have caused concern because they are long-lived in the environment.
- Regulations are under development to implement Section 12991(e) of the Agricultural Code relating to storage and disposal of economic poisons and containers which hold or have held economic poisons.



- A completely self-contained mobile chemistry laboratory has been put into use to test fresh produce in growing areas throughout the state. It provides on-the-spot analysis enabling the Department to further safeguard the health of farm workers and to add to consumer protection by detecting over-tolerance residues on agricultural commodities before they reach marketing channels.
- The Department has compiled and distributed emergency procedures for handling pesticides spills and fires. The procedure provides instructions for first aid, notification of proper authorities, area decontamination and information on waste disposal.
- Through the pesticide reporting system the Department may evaluate changing patterns in chemical use which has necessitated numerous changes in the residue analysis program when it became apparent that usage of certain types of pesticides were on the increase on specific crops. With this evaluation program the Department may respond more quickly to this change.

IV. Progress in Improving Conditions of Environment in Relation to Use of Such Materials

- The Pesticide Advisory Committee has been formed to advise the Director of Agriculture in establishing criteria and regulations to deal with environmental quality and other problems related to pesticide use. It is comprised of representatives from the State Departments of Conservation, Fish and Game, and Public Health, Water Resources Control Board and leaders from the fields of agricultural, biological, medical, ecological and general sciences.
- A statewide drive to improve farm conditions related to worker health and safety spearheaded by special county agricultural committees familiar with local farming areas is seeking to gain uniform compliance with laws and regulations. Emphasis is placed on the requirement of providing sanitary and handwashing facilities and the safe and proper use of pesticides. To protect workers against accidents involving pesticides, the committees widely distribute information concerning the safe and proper use of pesticides, involving the mixing, application, safety apparel, storage of containers, and medical supervision by a licensed physician.
- The Department of Agriculture and Public Health have negotiated an agreement for the guidance of mosquito abatement districts using pest control materials.



○ The Department intends that progress in improving the environment shall move forward as rapidly as possible within legal constraints consistent with continued agricultural production. Restrictions and loss of pesticide control materials have increased the cost of crop production. The intention is to move as rapidly as possible to prevent and control pesticide problems without causing intolerable disruptions in the agricultural community.